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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/543,185	03/23/2006	Norio Murase	080188	5492
23850 7590 11/23/2009 KRATZ, QUINTOS & HANSON, LLP 1420 K Street, N.W. Suite 400 WASHINGTON, DC 20005				
EXAMINER				
HOBAN, MATTHEWE				
ART UNIT		PAPER NUMBER		
1793				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/543,185

Applicant(s)

MURASE ET AL.

Examiner

Matthew E. Hoban

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 August 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6, 7 and 10-17 is/are pending in the application.
- 4a) Of the above claim(s) 1-4 and 10-12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6, 7 and 13-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-06)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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4. Claims 6-7 and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barney in 2002/0110180 in view of Petruska in 7226953.

Regarding Claims 6-7: Barney teaches a temperature sensing composition that includes a matrix composition and semiconductor nanocrystals exhibiting fluorescence. It is stated that the quantum efficiency of the nanocrystals used can be greater than 20% and even greater than 80%. (See Paragraph 18). Barney goes on to state that the matrix in which the semiconductor nanocrystals are disposed can be an inorganic matrix such as a sol-gel derived matrix. (See paragraph 30). Barney then gives suitable precursors for such a matrix including hydrolysable compositions including silicon alkoxide (Si(OR)_4) (See Paragraph 32).

Barney fails to teach functionally modified triethoxy silane as a sol-gel precursor.

However, Petruska teaches that the loading amount in sol-gel glasses can be optimized by a ligand exchange process on the semiconductor particles. After this ligand exchange, the semiconductor is passivated and functionalized to interact with the host matrix. This process is said to increase the amount of quantum dots which can be suitably incorporated into a sol-gel matrix to up to 20 vol%. Based on the average QD size taught by Barney (7 nm), this leads to a maximum molarity of 0.002 mol/l of the quantum dots. This range of molarities represents an overlapping range with the claimed subject matter. This high

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loading as stated before is accomplished by a ligand exchange of the semiconductor particles wherein, the ligands on the particles are substituted with a ligand having the formula $X-Z-Y$, wherein X includes among others thiol (mercapto) groups and thiol groups, Z is a carbonaceous group including alkyl, and aryl (phenyl), and alkylaryl groups, and finally Y is a functional group to interact with the silane compound, which is chosen from a group comprising hydroxyl, carboxylic, and alkoxy silane groups. Using the above ligands in conjunction with the silicon alkoxides of Barney to form a sol-gel glass of the same composition as that claimed. It is noted once again that the use of the modified trialkoxy silanes is a product by process claim. The use of the above mentioned ligands would result in a sol-gel glass of the same chemical structure as the sol-gel glass claimed. Although there are differences in the process of making the glass, the final product is essentially the same. Proof of this fact is shown in Figure 1 of Petruska, which shows the structure of an exemplary glass, wherein, it is shown that an amine passivation agent integrally links through an alkyl group to the metal elements within the sol-gel matrix. Therefore, the combination of Barney in view of Petruska results in a sol-gel glass comprising the product of said organoalkoxy silanes claimed.

Regarding Claim 13: In conjunction with the previous discussion of Barney in view of Petruska, Barney teaches that the matrix-semiconductor composite can be excited using a 480 nm wavelength excitor. Therefore the light emitting

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device system of Barney includes the matrix-nanocrystal composite, as well as a 480 nm source light. It can also further include a photomultiplier.

Regarding Claim 14: Barney merely states that alkoxy silanes are compatible with his process. Petruska further delineates particular sol-gel precursors which are compatible with the ligand terminated QD's of their teachings, which include for example tetraethoxysilane.

Regarding Claim 15: The composite of Barney in view of Petruska is of the same chemical structure as that of the claimed subject matter. It would necessarily follow that the hardness of the structure would be the same as that which is claimed. Composites of the same structure and chemical identity must necessarily have the same properties without convincing evidence to the contrary. See MPEP 2112.01.

Regarding Claim 16-17: Both Barney and Petruska teach the suitability of II-VI semiconductors. Both teachings include specific examples pertaining to CdSe, although CdTe is also shown to be a suitable quantum dot semiconductor for use in their endeavors.

Response to Arguments

5. Applicant's arguments with respect to claims 6-7 and 13-17 have been considered but are moot in view of the new ground(s) of rejection. Arguments

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as to the fluorescent yield of the quantum dots within the fluorescent material are unconvincing as the claim does not require the fluorescent yield within the composite, but only that the quantum dots have such a fluorescent yield. Therefore, dots having such a yield prior to addition in the composite meet this claim limitation. The limitation refers only to the quantum dots and not to the material as a whole. Furthermore, in the case where such an argument was in scope with the claims, suitable evidence as to why such a limitation would not necessarily be present in the material of the prior art must be presented. The arguments as to the difficulty in dispersing quantum dots throughout a sol-gel matrix are ameliorated by the addition of the Petruska reference, which contemplates the issue of dispersing QD's in a sol-gel matrix without agglomeration. The solution is to exchange the ligands of the QD's with a series of ligands which interact with the sol-gel matrix. These ligands comprise the same functionality of the silanes used by applicant and therefore the reaction of the particles with the silanes produce the same product, being a product with a high concentration of non-agglomerated QD's. The arguments as to importing the molarity of QD's from a polymer matrix to a sol-gel matrix are also resolved by the teachings of Petruska, who teaches suitable doping levels in view of her improvements to such glasses.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.**

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See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Hoban whose telephone number is (571) 270-3585. The examiner can normally be reached on Monday - Friday from 7:30 AM to 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew E Hoban/
Examiner, Art Unit 1793